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ROCKS AND MINERALS

A Magazine For Mineralogist, Geologist & Collector

OFFICIAL JOURNAL OF

THE ROCKS AND MINERALS ASSOCIATION

...BLISHED MONTHLY AUGUST, 1934

THE BULLETIN BOARD

MAINE MINERALS

A new mineralogical magazine that should delight the hearts of all collectors interested in Maine minerals has recently made its first appearance. It is a most attractive publication and its editor, Mr. Benjamin B. Burbank, of 15 Thompson St., Brunswick, Maine, deserves a world of praise. The first issue was the June number.

MAINE MINERALS will be issued quarterly and will be devoted to the advancement of interest in the mineral resources of Maine and the hobby of mineral collecting. Subscription price is $1.00 a year.

ROCKS and MINERALS takes pleasure in recommending MAINE MINERALS to all its readers and urges them to rush in their subscriptions to Mr. Burbank in order that this very interesting and attractive magazine be sent them regularly. Mr. Burbank by the way is a member of the Rocks and Minerals Association and is warm friend of ROCKS and MINERALS.

ROCKS AND MINERALS METEOR SOCIETY

It has been suggested to the Editor that a Rocks and Minerals Meteor Society be organized which shall consist of those readers of ROCKS and MINERALS who report observations on meteors seen. That to become eligible for membership one must first see a meteor, note the date, approximate time, location of the meteor and direction of its passage, and any other items on it worthy of note and to send all this information to the Editor. Those in favor of the new organization are cordially invited to send in their comments and any suggestions how the society should be conducted.

SPECIAL FLUORESCENT NUMBER CANCELLED

The Special Fluorescent Number scheduled to appear in one of the fall issues of ROCKS and MINERALS has been cancelled. We regret plans for issuing this number could not be carried out but matters beyond our control prohibits the printing of the special number this fall.

Our regrets are especially tendered Mr. E. Mitchel Gunnell of Galesburg, Ill., who, as Special Editor of the proposed issue, worked hard and faithfully in preparing personal articles and in soliciting articles from others in order that the Special Fluorescent Number would be a grand success.

WANTED: Correspondents in all parts of the world who will be kind enough to send us notes and news items on minerals, that they think may be interesting to the subscribers of ROCKS and MINERALS. Such as are available we shall be very glad to print in the magazine.

ROCKS and MINERALS

A MAGAZINE FOR MINERALOGIST, GEOLOGIST AND COLLECTOR

PUBLISHED MONTHLY --- FOUNDED 1926

Volume 9, No. 8 **Whole No. 38**

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The Official Journal of the Rocks and Minerals Association

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To assist its subscribers with their mineralogical problems and especially those who are beginners, ROCKS and MINERALS will gladly identify specimens and without charge if the following rules will be observed:

1. Only common minerals will be identified as we have no facilities for analyzing the rarer ones.
2. Number each specimen sent in as 1, 2 and 3 and keep duplicates of them.
3. Enclose a self-addressed stamped envelope with your letter.
4. No specimens will be returned. This feature is for your convenience only, so do not put us to the trouble of repacking and remailing specimens.
5. Address all letters and packages to Mineral Identification Department, Rocks and Minerals, Peekskill, N. Y.

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ROCKS and MINERALS

Edited and Published by Peter Zodac

PUBLISHED MONTHLY

The Official Journal *of the* Rocks and Minerals Association

AUGUST 1934

VOL. 9, No. 8

WHOLE No. 38

PREHISTORIC MARINE REPTILES FROM THE CRETACEOUS OF ALABAMA

By

J. J. RENGER

Of the many existing forms of animal life and their unique adaption to carry on their existence, none is stranger nor more fascinating than the life history of those animals that have survived through the ages, and whose ancestry and gradual modification can be clearly traced. The large number of living species, though staggering even to the most vivid imagination, is really insignificant to the untold myriads of forms which preceded them, and which in their struggle for dominance helped to shape the destiny of their descendants. In the progressive change, those animals which were most generalized as to behavior and biological function and were capable of adapting themselves to changes in environment through the geological epochs, were able to survive in the fight for self-sustenance and for the propagation of their kind.

The earth has been, and still is, the proving ground for all life; its code is stern and unrelenting but its objective seems to be towards producing perfection. In the hypothetical progressive evolution, life from its primal inception in the distant Archeozoic Era developed through the many primitive animals, culminating with the multicellular complexities of higher invertebrates in the Palaeozoic Era. The present definite division between vertebrates and invertebrates evolved in the middle of this Era; the change was gradual. In the Devonian period the fishes developed and flourished; then by gradual modification air-breathing amphibia evolved to dominate the close of the Palaeozoic.

The change from amphibians to strictly terrestial forms was not a chance occurrence. The animals enfranchised from water needed, besides a change of respiratory organs and circulatory system, a stronger skeleton to sustain their bodies; they needed a protective covering to retain as much moisture as necessary to carry on the physiological functions which had developed in a water habitat; they needed a means of rapid locomotion for evasion from enemies and also for aggression. The animals that most happily fulfilled the requirements of this transition naturally survived and dominated. With the domination of a class of animals there came radiation into greater variations to meet the needs of the environment. The passing of the armored amphibians to the terrestial reptiles was more gradual than previous and subsequent changes in forms. At the end of the Palaeozoic Era the reptilian radiation took place and manifested itself in the high water mark of the multivarious species of reptiles in the Mesozoic Era, the age in which they undisputedly dominated the earth. The Mesozoic Era was the "mediaeval age" of animal life. The land and the seas swarmed with an abundance of reptilian life; even the air was conquered by the bat-like reptiles, the pterydactyls. The latter birds evolved from these reptiles; the legs of the

existing birds still retain the reptilian scales. The mammals also branched off and many lower forms, as the rat, have scaly tails as vestiges of reptilian ancestry.

The rulers of the land were the familiar dinosaurs of ponderous bulk: their size and their wide and plentiful distribution has obscured the fact that the seas had held equally interesting terrors, the enormous sea lizards, the mosasaurs, and the giant marine turtles. The piratical, predacious mosasaur, and the "ferryman of the Cretaceous Seas", the mammoth sea turtle, represent the most highly specialized aquatic forms of the Era and are of unusual interest to the paleontologist. Together they were masters of the seas, and also were the most implacable enemies. It was the good fortune of the writer to recently unearth an unusually large, representative specimen of each of the animals in the chalk beds of Alabama. No order of animals had a longer nor more uneventful history and which has persisted to this day than that order of reptiles, the turtles, and of none is the immediate ancestry more obscure. If the turtles were not so familiar to us, or were entirely extinct, as nearly all the forms of that prolific age, they would be considered the strangest of reptiles and perhaps the strangest of vertebrates. The turtle is the only animal that can hide its head and limbs under its ribs. The shell of the turtle is nothing more than the backbone and the ribs flattened and expanded to form a dome to shield the animal.

The modern leatherback turtle, a descendent of the ancient sea turtle, in exceptional cases, attains the length of six feet; but this size is only half that of the specialized giants among the turtles of the upper Cretaceous. The recently found specimen has an overall length of over ten feet, and a spread between the front flippers of eleven feet. One of the front flippers measured from the joint in the shoulder girdle to the tips of the middle digit, is four feet and four inches. The estimated weight of this turtle in the live state must have been over two and a half tons. Although the animal's great weight and shape are not very conducive to fast swimming, yet the well constructed limbs and the indication of great musculature compensated for this hindrance and made the turtle a powerful and relatively fast swimmer. The head is twenty inches long and is equipped with a formidable overhanging, pointed beak six inches long. This massive beak was a good weapon of defence and an equally effective means of securing food, for it suggests an adept crusher of shell fish and crustacea which afforded an almost inexhaustible source of food.

The other specimen, the sea lizard, is no less impressive in size and is of unusual interest because of the singular anatomical structure of the head. The head is five feet long, of which the jaw, equipped with sharp curved teeth, is three-fourths that length. The skull is about one-sixth the entire length, and the relative size of the head to the body indicates predaceous and pugnacious habits. The unique feature of this thirty-five foot lizard is the conspicuous ball-and-socket joint in the middle of the lower jaw, the tip of which is not fused, but connected with ligaments; this combination permitted lateral flexing of the jaw. In this respect the mosasaur differs from all other animals, ancient and modern. Besides the joint in the lower jaw, there is a second row of teeth, the throat teeth, implanted in back part of the palate. This unusual formation of the masticating apparatus was essential to the existence of this animal; for without prehensible limbs, as in the modern lizard, nor with teeth adapted to tearing its prey apart, the mosasaur had to swallow its food whole. In feeding the mosasaur seized its prey between the jaws, then retracted the lower jaw by bending it laterally at the socket joint, then forcing the food, usually some slippery fish, back farther between the jaws. Then by extending and retracting the lower jaws and each time renewing its bite with more posterior teeth, the prey was steadily pushed far enough back to be seized by the muscles of the throat and the throat teeth.

Like all ancestral stock of the lizards, the mosasaurs had a pineal eye opening in the top of the skull; but it is still questionable whether it had a third functional eye as in the present Rhyncocephlia of New Zealand, the only living animal with three eyes.

It is sometimes inconceivable to believe when viewing fossil exhibits in museums that monstrosities of the

size of the mosasaur and the giant turtle existed in relatively large numbers in the shallow seas of the Cretaceous period, but the evidence of the numerous and scattered remains assures us of such a condition. There are chalk deposits that are littered with fossil remains and which seem to be veritable cemeteries of ancient animals. The concentration of fossils in one spot is possibly due to the abrupt ending of that luxuriant era. The end of the age of reptiles was sudden and decisive, as if a world-wide catastrophe occurred. It was not as we now may think of sudden endings, but geologically, it was most abrupt. Of all that swarming and teeming reptilian life nothing is left except some vestiges in the present dimunitive forms and in the nearly unmodified turtles.

The cause for the rapid decline of Mesozoic life has been a controversal subject for a long time among paleontologists; their explanations are conjectures at best. The most logical cause was the evolution of the mammals in the Mesozoic Era. The archaic mammals were small rodent-like animals, about the size of a rat, and these preyed on the unprotected eggs of the reptiles. By destroying the power to reproduce their kind and finally wiping the repiles off the earth, the mammals became the dominating animals of the following age, the Cenozoic Era.

Another reason for the rapid extinction that seems quite plausible is that geological changes, such as large land upheavals, and the consequent changes, killed off the reptiles. The elevation of the land brought about new climatic conditions, and the terrestial animals could not stand high altitudes. The change of climate also depleted the food supply for the herbivorous reptiles, and with their decline the carnivorous ones also died off. The seas were also thrust up and changed to shallow drying pools, in which the plentiful marine life was constantly concentrated, resulting in keener competition for food and an internecine warfare with a consequently more rapid extinction. It is such concentration that gives us the excellent fossil grounds on small areas; these were perhaps the last strongholds of a dying race.

Another interesting conjecture is the one giving "racial senescence" as a cause. But all causes prove only one thing; the animals could not adapt themselves to changes, for they were too highly specialized for the status quo of their environment. Had the animals been more generalized, as were those ancient animals which survived, then the change, whatever it was, would not have been the deathknell for the reptiles of the Mesozoic Era. Despite their physiological shortcomings, or the terrestial changes, fossils from the "Age of Reptiles" are still the most interesting story in historical geology.

Courtesy of Field Museum of Natural History.

ICHTHYOSAURUS FOSSIL SKELETON FOUND IN BAVARIA

IRIDESCENT OBSIDIAN IN OREGON

By

P. L. FORBES, Stauffer, Oregon

While large quantities of obsidian are found in many parts of the world, none is equal to a "find" made last summer by the writer, according to comments sent in by mineralogists, geologists and others who secured specimens of the new obsidian. Some mineralogists call the new find of obsidian "iridescent," others "opalescent," and still others "chatoyant", due to the play of colors exhibited under reflected light which in turn is due to the interference offered to light by minute cracks or inclusions. This variety of obsidian[1] is found only in volcanic bombs.

A number of theories have beeen advanced by geologists as to the cause of the cracks and inclusions. Some believe they are due to an exceedingly heavy strain while cooling; perhaps the bombs on being thrown out by a volcano alighted in water whereby the strain took place. Another theory is that the molten obsidian being thrown out of a volcano with explosive violence cooled in its passage through the air, thus forming incipient microscopic crystals of quartz as well as other minerals and upon striking the earth, the crystals being yet in a somewhat plastic state were either fractured, bent or distorted in such a manner as to form minute cracks.

It seems impossible to believe that blocks of obsidian 8x10 inches in size are made up of 100 or more layers from 1-32 to 1-2 inch in thickness and of many shades and colors. The play of colors is best seen when specimens are held in the light at a slight angle and viewed in a direction parallel to the length or width of the layers. If specimens are broken across the layers, the play of colors canot be seen; only black parallel lines.

Many varieties of obsidian have been found. One is opaque, having layers of blue, green, red, pink, golden and a number of other colors. Another is nearly transparent, yet, if reflected in strong light will show beautiful colors. The golden variety is peculiar, having a delicate, finely banded pattern of red and black material but showing a play of golden colors similar to that seen in tiger eye quartz. This material is especially attractive when cut en cabochon.

Still another type of obsidian is one containing minute bubbles of air or gas as inclusions. In this variety some occur which exhibit the bubbles in minute form, as a sort of haze and when cut and polished they are most remarkable in that they show a distinct sheen not unlike that of moonstone. This frothy variety is unlike that of any other kind and at first glance, cut and polished specimens do not appear to be obsidian at all. The variety having larger inclusions of gas is suitable for cabinet specimens but does not polish as well as that having minute inclusions.

The iridescent material, when cut and polished en cabochon and the layers properly shown, make attractive gems. The most beautiful of all seems to be the blue color which is similar to that of precious labradorite. This variety is very difficult to find and there is not much left of it at this writing. There is a possibility of finding more by removing soil at the locality.

The writer has also found a few specimens of common obsidian combined with the iridescent variety. Another rare variety found is the opaque variety with layers combined with a translucent variety.

The locality for these beautiful obsidians is at a restricted area on Glass Butte, near Stauffer, Lake County, Oregon. The butte, one of three, is 6,200 feet high and towers 2,000 feet above the valley. Near this spot are large beds of common obsidian where Indians formerly had large workings and had removed hundreds of tons of the obsidian in their quest for nearby where obsidian was mined and

[1] A fine assortment of this rare obsidian was sent, gratis, to the Editor by Mr. Forbes.

shaped into long needles—some being 7 inches long and not over 1-8 inch the better grade of material for the making of arrowheads and blades. The workings were acres in area and at least six feet in depth. The writer has quarried obsidian nearly 1-2 ton in weight at a depth of 8 feet. It is evident that the loose pieces on the surface have been cracked by frost.

It was the belief of Indians that they should not drink water while making arrowheads or blades.[2]. It was also believed that were an arrowhead, or blade, broken in the making that the Gods were against the workers. The broken pieces were then simply thrown down and never touched again. Nor would an Indian curse or show anger should an arrowhead snap in two in the making, as then a punishment twice as severe would be meted out to him, he believed. On the contrary he would sing songs to his Gods when he started making another arrowhead. Thus it is that the writer has found, time and again, the two pieces of a broken arrowhead, nearly finished, lying near each other. These could easily be cemented together and should make attractive specimens for the dark corners of cabinets. Blades have been found 14 inches long but 8 inches is the general length found. To date, about 20,000 of these broken arrowheads have been found at various spots on Glass Butte, but the most beautiful ones come from the spot where the iridescent obsidian occurs. One blade (unbroken), 9 inches long, together with a stone hammer, dulling stone, and other tools, were found under an old juniper tree. Whether the worker was killed, driven away, or simply left the spot is a question that will never be answered. It was while hunting for these unfinished blades, etc., that the writer noticed chips reflecting many beautiful colors in the sunlight. Further investigation resulted in the discovery of the volcanic bombs which yield the most beautiful obsidian known in the world today. Most bombs lie loosely on top of the ground but some are buried at a depth not exceeding one foot.

The Indians had another locality in diameter. The long ones were broken down to 2 inch lengths and these sewed with sinews to the bottom of the squaws' buckskin shirts or hung around their necks as ornaments. This information the writer obtained from Mus-su-peta-na (Up River Boy), an aged Indian who was taught the art of making fine blades and arrowheads by his uncle Mus-sey-peu-ua-fich (Up River Coyote), an expert in the Karok tribe. All the fancy arrowheads, blades, etc., used at their bi-annual White Deerskin dance came from this beautiful obsidian which by them was considered very sacred and was used only for display at these dances and then buried. It is the opinion of many that at least 30 per cent of the blades and arrowheads were broken in their making but Mus-su-peta-na is more expert than the ordinary Indian and breaks only about 20 per cent. He has had over 50 years experience working obsidian and specializes in extra fine work. It is the opinion of the writer and others who have seen his work that he is the most expert arrowhead maker in the world. He has taken a 1-2 ton block of obsidian and made a blade 42 1-2 inches long, 9 inches wide and only 1 3-4 inches thick. The writer has also seen him make over a hundred blades from 12 to 30 inches long and believes there is no trade so hard to master as this one. This Indian stated at one time that he worked over 15 years before he could do even fair work; he also made the statement he could take a marble or a round ball of obsidian and make a nice arrowhead out of it.

Although the time has gone for the Indian to have much use for obsidian, the paleface on the contrary has found many uses for it as in gems, ornaments, cabinet specimens for collectors, etc. But unless more is found, the beautiful iridescent obsidian will not supply the demands of collectors very long. The supply is very limited.

The writer believes he is the only person in the world who has found ancient Indian-made arrowheads of pink, red, blue, green, yellow and many other colors and shades of iridescent obsidian. A cordial invitation is extended to all mineralogists, geologists and Indian relic collectors and especially to readers of "Rocks and Minerals Magazine," who may be in this section of Oregon, to call around and examine his collection of iridescent obsidian and other specimens.

[2] A blade is a large slab of obsidian that was roughed down at its place of origin and then taken to camp where the Indian dressed it with a knife, spearhead, etc.

BLUE HILL AND FLORIDA PARK, PENNSYLVANIA

By

THOMAS J. LEWIS,

6707 Lansdowne Ave., Philadelphia, Pa.

Five and thirty years have gone
Since I was young and charming
Thoughts like this popped in my head;
That I would practice farming.

Now what a calamity that would have been, can only be told by those who look into their microscope and see 'them 'ere fields" of beautiful crystals, perfect in form, gorgeous in coloring and wonderful in groupings, gathered from the hills of Pennsylvania during the Bicycle Epoch, when mankind kicked his way hither and yon and back again with his wheel loaded with rocks, just prior to the advent of the Auto-juggernaut Age.

BLUE HILL SCHOOL, DELAWARE COUNTY, PA.

Located on the edge of the Serpentine belt, reached by several roads, but the best way is to be there, then you will not have to go, which is good medicine for most localities as it saves the time of going, with the chances of getting lost eliminated. With this lucid explanation, let us proceed

MINERALS

Chrysotile; silvery and green in narrow veins in Serpentine; when ground and polished in line with the fibres, it makes a beautiful specimen as the fibres show a waving silky lustre in contract to the dark Serpentine. This mineral is also atractive in the rough.

Another variety is finely veined and mottled, that is very attractive in the rough and especially so when polished.

Picrolite, a fine grained variety of an apple green color, which takes a fine polish, is also found here.

Talc, a fine grained green talc, is found in small pieces; also a white lamellar variety.

Interesting, but rare, is a phantom Quartz, being ferruginous crystals enclosed in clear Quartz.

About one mile Southwest from the school, there is an old Amphibole Quarry, where nice bladed Actinolite in Prochlorite can be had in abundance. In the fields around, fine emerald green bladed Actinolite can occasionally be found in large lumps.

About one mile down the road from the school, is Palmer's Mill Road; once a bad hill down, then across Crum Creek and up a worse hill, but now a splendid concrete road reaches from crest to crest and dams back Crum Creek, forming a beautiful lake, while in the valley below is an attractive terraced fountain fed by the overflow from the lake. At this point we drop the bicycle and take to the car.

FLORIDA PARK

Our road crosses the dam toward the east (giving a fine view of the valley), then northwest to Newtown Square on the West Chester Pike, west on the Pike to Florida Park. At this point the road has a heavy down grade, while the ridge on which the park is situated continues on and forms a headland close to Crum Creek. A short distance east of Crum Creek is a cart track to the south, which leads to the base of the hill about one hundred and fifty yards from the road. The top of the hill is our goal; up a hundred feet through brush and brier to the top which is covered with rocks peculiar to the Serpentine region. Although the crystals are very small, they form attractive cabinet specimens; one specimen in particular, is a flat rock about seven inches in diameter with crystal lined walls, intersecting like the foundation of a ruin, about half an inch high.

LIST OF CABINET SPECIMENS

Ferruginous Quartz, in good cabinet specimens with one side covered with small bright crystals, showy and choice.
Ferruginous Quartz, brown cellular specimens.
White cellular Quartz, with partitions and cavities lined with crystals.
Drusy Quartz, in fair specimens, variegated on Jasper.
Black cellular Quartz, cavities lined with clear crystals, filled with black inclusions. A Manganesian Quartz.
Gothite, massive, fibrous and shining.
Hyalite, in small colorless to white globules on Quartz.
Jasper, fair quality and well marked, coated with Drusy Quartz.

MICRO MOUNTS

Quartz, small clear crystals, enclosing octahedrons of Chromite.
Quartz, enclosing Chromite with Xanthosiderite in thistle-like forms.
Quartz, enclosing Chromite Xanthosiderite with Gothite in spiny balls (high power.)
Xanthosiderite needles on Quartz.
Ferruginous Quartz in bright red crystal aggregations.
Yellow Ferruginous Quartz.
Quartz in limpid tinted crystals.
Quartz in pale blue tints.
Drusy Quartz, variegated, red, wine red, blue, yellow, white, milky,, etc.
Colorlesss Quartzoids and prismatic crystals.
Hyalite, colorless and milky globules on matrix.
Golden Gothite in Hyalite, similar to Sunstone.
Red Gothite crystals sprinkled on Quartz.
Pyrolusite crystals on Quartz; also botryoidal forms.

LOOSE CRYSTALS

Some of the cavities, when broken open, spilled out loose crystals; all doubly terminated, clear colorless prisms, ferruginous bright red crystals, colorlesss prisms filled with inclusions of Chromite. Others showed Gothite in spiny balls. Still others, though few, showed thistle like forms of Xanthosiderite.

One crystal, one-eighth inch long, magnified up to five inches, showed fully a hundred crystals enclosed and is but a sample of the many to be found there.

One minute perfect cross is planted on the face of another crystal, which forms a fine base for the cross.

CASTLE ROCK

Being in close proximity to this famous rock, a few words would be fitting. Located on the west side of Crum Creek, the rock is fully a hundred feet high and is composed entirely of Enstatite, which, judging by the local out-crops must form a large bed in this section.

ROCKS AND MINERALS CLUB OF LEHIGH VALLEY

There has recently been organized in the Lehigh Valley of Pennsylvania a Rocks and Minerals Club. The plan is to arrange for occasional trips during the spring, summer and fall to places of mineralogical and geological interest and especially to localities favorable for collecting. During the winter months, there will be occasional evening programs.

Dr. Donald M. Fraser, of Lehigh University, is chairman of the club. The other members of the executive committee are Mr. Floyd R. Faux, of Bethlehem, Pa., secretary; Professor Charles Cabeen, of Lafayette College, Easton, Pa.; Professor Albert Fasig, of Muhlenberg College, Allentown, Pa.; and Mr. John McNeal, of Easton, Pa.

ROCKS AND MINERALS ASSOCIATION SECOND NATIONAL OUTING

(Continued from July)

SOUTH DAKOTA

Director: Mrs. Edna Scott. Two hundred and twenty-four people from eleven states gathered for a picnic dinner and listened to an instructive and entertaining program. The site chosen was the Scott Rose Quartz Mine, eight miles southeast of Custer, S. D. Inspection of the mine and of the large new log cabin with fireplace of specimens, erected by Frank Scott, were the chief features of the day. Interesting speeches by Charles E. Scott, Geo. W. Scott, El Comanche, famous naturalist, and Badger Clark, Black Hills, poet, were very warmly received.

GEMS IN CALIFORNIA

By

J. W. PATTON

There has never been a time in the history of the world, when so many of the cheaper gems were used in jewelry, also there has never been a time when so many people were interested in gems and minerals. This age will be referred to in the future as "The Age of Hobbies." Many people are engaged in making collections of all kinds of things such as fancy needlework, hand-carved furniture, inlaid wood work, brass, and copper, and silver articles. A list of all the hobbies people are engaged in would fill a large volume, and they are all in deadly earnest, but I believe the study and collecting of gem materials and minerals is the most fascinating and instructive hobby known today.

In order to carry this hobby to a conclusion, I have learned to find the gem stones, cut and polish them, and mount them in silver jewelry.

The rough specimens I classify and place in my cabinet with the name and description on a card. This cabinet is a constant source of pleasure to me.

Many good books and magazines are being published on the subject. The public libraries are well supplied and the withdrawal cards indicate that they are being read. I find "Rocks and Minerals" the most interesting and instructive of the magazines.

The "Los Angeles Mineralogical Society," of which I am the field trip leader, is carrying on an educational campaign in minerology which is converting many people to the study of Geology and its subdivisions, Mineralogy and Gemology.

Collectors in California are very fortunate. Gem stones are easily found in all parts of the state. The great pegmatite Dikes in San Diego County and Riverside County have produced gems unsurpassed anywhere. Beautiful tourmalines in pink, red, white, green, black, and blue, and some which show three colors, — red, green and blue, have been mined there. The mines at Ramona produced Tourmaline, Hyacinth, Zircon, Beryl (Aquamarine and Emerald) in addition to fine quartz crystals, some clear, some citrine, and some smoky. The mines at Mesa Grande produced the same, and the mines at Pala produced all these and in addition the magnificent lilac gem "Kunzite." These mines and others, in San Diego and Riverside Counties, produced also all the varieties of Garnet. Almost all the counties produce Chalcedony in agate form and in seam deposits, as well as massive and in Geode formations.

Los Angeles County produces Chalcedony formations in great abundance. The most striking being the "Green Agates" and the "Porcelain Agate." The Porcelain Agate is white chalcedony with green spots and figures. The green agate is clear chalcedony with mossy-green inclusions. Thetis Hairstone is found in this county. Lapis Lazuli is also found here.

The copper mines produce beautiful Chrysocolla, some of which is No. 6 hardness. This we call Copper Silicate. These same mines give us wonderful Malachite and Azurite, all of which makes blue and greeen gems for costume jewelry.

Several localities furnish very good Turquois, a gem which has beeen popular since ancient times. The Mojave Desert brings us wonderful agates in all colors, as well as moss agate. From San Benito County we get the glorious Benitoite, a deep blue gem, equal in every way to Sapphire. In fact it is more brilliant than Sapphire. With the Benitoite in a white matrix of Natrolite comes Neptunite, a beauiful black gem.

Some Fire Opal comes from the Black Mountains. Very fine common Opal, in different colors, and milk opal are found in several counties.

In the Panamint Mountains on the border of Death Valley, we find blue Chalcedony and Myrickite. This Myrickite is a lovely gem of clear chalcedony colored red by Cinnabar.

All the Desert region furnishes Chalcedony gems such as Jaspar, Silicified Wood, Opalized Wood, Onyx, Sardonyx, and Ribband Agate. From

the northern part of the state comes a beautiful red Jaspar, with inclusions of Iron Pyrite, which makes fine gems. Some white and pale blue Sapphires have been found, also some small Rubies. Something like four hundred (400) diamonds have been found in the northern counties, but the source of these has not been discovered.

Basanite, a smooth, velvety, black gem, and Creolite, a banded Chalcedony formation, come from Imperial County. In addition to these we find Carnelian, Cat's Eye, Amethyst, Citrine, Chrysoprase, Californite, Chrysoberyl, Spinel, Labradorite, Rhodonite, Moss Opal, Obsidian, and Geyserite, all of the stones mentioned are hard enough to make gems.

I have found specimens of most of the gems mentioned, and have cut and polished them. They are all being used now for costume jewelry.

The State of California is a "Happy Hunting Ground" for Rock Hounds.

HAVING FUN WITH MINERALS

By GEORGE B. GOODWIN

All hobbies are amusing and educative, but to become popular a hobby must also be interesting. Having tried collecting everything from cigarette pictures to jig saw puzzles, I feel qualified at the present moment to advocate studying rocks and minerals and collecting specimens as one of the most fascinating of fads.

One gets started by happening to take a course in geology at the University, or in physical geography in High School, or by being a boy or girl scout, or by happening to pick up a curious stone on the sea shore, lake shore or in the mountains.

Beginings are small but the field is vast. The findings of rare or singularly beautiful specimens is thrilling and special trips to the places where such treasures may be found are always delightful.

Alone or one of a party, you go to the lake, the sea shore or the mountains, you haunt the brooks and traverse the open fields and if perchance you come upon an abandoned quarry or a fresh railroad cut or a mine, whether new or old, the success of your trip is assured

As soon as your friends know that you are interested in collecting rocks and minerals you will find yourself the recipient of numerous gifts for those who are not sufficiently interested to become collectors are still anxious to have their treasures preserved.

As your collection grows you will begin to patronize the dealers who offer every possible help by means of their catalogues and circulars and even individuals who are not dealers, and perhaps not rock collectors, will often have beautiful stones which they will part with either by way of gift or demise or bequest. In your own locality you will surely find collectors who will covet all of your treasures and be willing to part with some of their in exchange.

The acquistion of a collection is not nearly as difficult nor as expensive as it may seem, and after acquiring, the specimens present many fascinating problems, not only of classification and identification, but that big one always present "What shall I do with them?" You will arrange your specimens in cabinets, on shelves, in shoe boxes, and in old trunks, sometimes to be left undisturbed for months and years, affording pleasure when rediscovered. It is more fascinating to rivet your attention on the classification of your finds and for that purpose the libraries are full of books and the collectors are happy to confer, the museums are free and special helps are plentiful.

Some of the collateral uses for rocks and minerals are overlooked. They may be used for ornamental purposes from such large enterprises as building rustic fireplaces and walls, for driveway cuts and for ornamenting bird baths or garden benches to such uses as ornamenting flower pots and vases and aquariums. Hundreds of original uses can be thought of for the brilliant white pieces of Satin Spar, the beautiful blue Azurite, the shiny green Malachite, the pale yellow of Aragonite and the golden sheen of Lepidolite.

So much pleasure is to be had from the collection of rocks and minerals that I recommend it as a hobby even for tired business men.

DID ANYONE SEE THIS METEOR ?

By

PETER ZODAC, Editor Rocks and Minerals

Monday night, July 23, 1934, at 9:30 o'clock, daylight savings time, a meteor was seen in the south, traveling from east to west at a low elevation and aparently in a horizontal line. The meteor was sighted by Robert Taylor of Peekskill, N. Y., while talking to friends in front of his home. The friends, Mr. and Mrs. John J. Heleker and daughter Florence, and the writer, all saw the heavenly visitor. To the observers, the meteor appeared as a huge ball of bluish light surrounded by a whitish haze and traveling at a rapid rate. It was a clear moonlight night (full moon)—with little or no breeze—and the meteor was plainly visible. Unfortunately, the field of sight was so small, as trees and houses on both sides of the street interfered, that the meteor could be observed for only a short interval. Interest in the meteor became so acute that the writer was persuaded to give more than a passing notice to it. It would also be of scientific interest and value to have reports on observations by others and with the hope some of these people could be reached, notices in local papers were printed the next day, Tuesday, July 24. The results have more than justified this move. Twenty-six people who had seen the meteor were good enough to telephone, write, and even to call in person to submit reports.

The reports were most interesting. To some it was the first meteor they had ever seen and it was at first mistaken for a giant sky rocket except that it was more brilliant and was accompanied by no noise. All observations regarding direction, elevation and approximate time were the same as already reported. Other observations varied somewhat which is plainly conceivable. The appearance of the meteor was wholly unexpected and one had to be on the alert to take in the details. The main difficulty was the fact that the meteor was not visible to all during its full length of passage as trees, buildings, and other obstacles were in the way. On the whole the observations were entirely satisfactory.

Among the important observations called to the writer's attention are the following:

1. John S. Hogan. Mr. Hogan lives a short distance east of Peekskill. His home is on a hill from which a good view south can be obtained. At the time of the meteor's appearance he was sitting on the porch with a friend and the two had a very good view of it. To Mr. Hogan it seemed that the meteor was visible for five minutes—but it must have been considerably less—and that its color was not very bluish. but just before it disappeared it BROKE IN TWO AND ONE PIECE FOLLOWED THE OTHER.

2. John Gardiner. Mr. Gardiner was in New York City that night and saw the meteor from the corner of 33rd St. and 11th Ave. His views coincided with the original report. Mr. Gardiner's observation was from a point 43 miles south of Peekskill.

3. Mrs. Mary Mathias, Graymoor (3 miles north of Peekskill). Observations same as reported.

4. C. F. Klingenstein, Granite Springs (9 miles east of Peekskill). Observations same as reported except that sparks were flying away from it.

5. Edward Purdy. Mr. Purdy was on the ferry slip at Verplanck's Point (4 miles southwest of Peekskill) on the Hudson River and had a very good view of the meteor. He saw the meteor shoot across the sky, break in two with one piece underneath the other, and there was a break in the line of passage; the two pieces shot downward at a small angle and disappeared suddenly before they hit the opposite side of the river.

6. Mrs. Rodman Odell. Mrs. Odell's home is in Hudsson View Park, a high elevation of land. She was on the porch of her home facing due south at the time of the meteor's appearance and saw it appear, practically out of no-

where, grow larger and brighter and shoot horizontally across the sky. She also saw the meteor break in two—but did not notice if there was a break in direction as reported by Mr. Purdy nor how the pieces were in reference to each other. Its passage across the sky could not have been more than a minute and it disappeared suddenly.

The conclusions to be drawn are as follows: The meteor appeared suddenly in the south at 9:30 P. M., Monday, July 23, 1934, grew larger and brighter and then shot horizontally across the sky from east to west at a low elevation and in a horizontal line. It made no noise, proving it was many miles away, but it shone very brilliantly from white-to-yellow-to-blue light. Its size was about that of a small basketball. Its passage through the sky was only about a minute and that it broke into two pieces with a slight break in the direction of line of travel. The pieces apparently never fell on the earth but may have burned themselves out (hence the sudden disappearance). Mrs. Mathias' observation was from a point 3 miles north of Peekskill; Mr. Gardiner's was 43 miles south of Peekskill; Mr. Klingenstein's 9 miles east of Peekskill; and Mr. Purdy's 2 miles west of Peekskill (4 miles southwest)—thus the meteor was visible for a distance of 46 miles and for a width of 11 miles—but it was many miles still to the south according to Mr. Gardiner's report. The writer would gratefully appreciate receiving reports from any readers who may have seen the meteor, and especially if they reside outside of New York City; then it would be possible to plot the approximate position of the meteor and its line of passage.

Meteors are masses of rock or mineral substances traveling through space. The popular belief is that meteors were once part of some heavenly planet. When they hit the atmosphere of the earth, meteors burst into flame and burn with dazzling light. Meteors frequently burn up before they reach the earth. If they do reach the earth they are called meteorites.

CAPE BLOMIDON, NOVA SCOTIA, A Noted Mineral Locality

The Amateur Lapidary

Conducted by J. H. HOWARD*

504 Crescent Ave., Greenville, S. C.

Amateur and professional lapidaries are cordially invited to submit contributions and so make this department of interest to all.

*Author of—*The Working of Semi-Precious Stones*. A practical guide-book written in non-technical language for those who desire to cut and polish semi-precious stones.

New Gem Polishing Technique

By

ARTHUR KNAPP

Every lapidary is troubled with the so called scratches which appear when polishing flat surfaces. This is not confined to the amateur The professional also has this trouble.

The scratches, which are referred to, are those made by the polishing medium. These are of two kinds. One kind is really a polished groove and appears to be made by the accumulation of grains of the polishing medium along an unpolished edge of the surface being polished or in flaws in that surface.

The second class of scratches are usually irregular in both width and depth and when examined under a microscope and give the appearance of having been chipped out. The writer believes these to be caused by an accumulation of grains sticking together and rolling across the face being polished.

In either case, the problem is to prevent the grains from accumulating. It is usual for the lapidary to use a very small amount of the polishing medium and to polish on a dry lap in order to prevent the grains from either accumulating or sticking together.

The writer has spent a great many hours testing various mixtures in an attempt to find some inert substance which would produce this effect. The results of these tests lead to the conclusion that some emulsifying agent might work.

Soaps do not improve the polishing action on flat surfaces materially, probably for the reason that a slight amount of animal acid may be present. The writer's experiments tend to show that all polishing mediums should be alkaline for use on a tin lap. This is particularly true of Alumina. This is a polishing medium that every lapidary should have. While it does not work well on all gems, it has been found by the writer to be very useful in particular cases[1] Alumina should be mixed with salt and the final polish should be made on a dry lap for the best results. The writer has recently been using a preparation called Gardinol[2] This is an emulsifying agent and has a decided effect in eliminating scratches. A great deal more of the polishing medium may be used when mixed with Gardinol and polishing is, therefore, much more rapid. The best polish is obtained by a final touch on a dry lap The speed of the lap may also be increased, since it is possible to use a wet lap up to the last moment of polishing and thus keep the gem from over heating. This also decreases the working time.

[1] E 90 Alumina at 40 cents per pound post paid, Norton Company, Worcester, Mass.

[2] Gardinol, W. A. High Conc. at 60 cents per pound post paid, National Aniline & Chemical Co., 200 S. Front Street, Philadelphia, Pa.

The condition of the lap is particularly important with Gardinol. It shows no particular advantage on a lap with a glossy surface. It is possible to remedy this condition with coarse sandpaper but this is only a temporary expedient. The best polishing surface may be produced by following Howard's directions in the June, 1933, issue of Rocks and Minerals.

THE DIAMOND SAW AGAIN

F. S. Young of the **Oregon Mineralogist** kindly sends some interesting dope on the diamond saw. My instructions have been to use 1-2 carat of dust on the 10" saw and 1-4 carat on the 7" saw. I have represented that with this treatment a life of from 50 sq. in. to 150 sq. in. of sawing may be expected.

Young calls attention to the fact that if the quantity of dust be doubled, using 1 carat on the 10" saw and 1-2 carat on the 7" saw, the life will be six times as great. Namely from 300 to 1,000 sq. ins, of sawing may be expected from a single charge.

This is certainly a money saving and time saving scheme. I would be glad to hear from those making this experiment as to how well they check Young's figures. Even if the amount of sawing be only doubled it would be a very profitable way to make the saw as it would save the labor of one recharge and definitely the saw will cut faster with the heavier charge.

J. H. HOWARD.

AMATEUR LAPIDARY DIRECTORY

Neave, Frederick W., 1523 Henry St., Berkeley, Calif.

Rautenberg, A., 12072 Racine Ave., Detroit, Mich.

DEVIL'S DEN, NEWBURY, MASS.

Our Junior Club

Conducted by
ILSIEN NATHALIE GAYLORD

Dear Juniors:

It is so hot today let us take our study specimens and go down by the creek for our lesson, where the breeze is fresh and cool. Besides, several of our Juniors who live in poor collecting areas write that all the specimens they can find are what people call "just common junk" — queer gray stones with zigzag lines across them, a bit of rock with tiny crystals in it, a few colored pebbles, and such uninteresting specimens.

Perhaps we can find some of this common junk down by our creek too, and then we will see if it is so very uninteresting after all. So with a Club cheer and greeting to the new members who have come in this month, we will take these shining bits of metals which are to be our lesson today and go down by the creek.

METALS

Here we are, and how cool the water sounds rippling over the rocks. Now for our lesson on metals. Here is a little gold nugget, and this is copper. Here is some chalcopyrite which looks like pale gold, and this piece over here is a sheet of mica.

Why do we call them metals? Are they not also minerals like the others we have been studying? Yes, but just as crystals are different in shape and color and in some other ways from rocks, so metals are different in certain ways from other kinds of minerals. As we look over this shining heap of them, what do we notice first? It is their lustre, the shine of them, isn't it? Crystals shine, too, but not just like these. Theirs is a glassy shine, but these have a metallic sheen.

Now for some more points about metals. How do we usually speak of gold? We say, "pure as gold," do we not? That is another distinction of metals. Nearly all metals are formed of just one kind of mineral, or element, as it is called. Real gold is just pure gold alone and nothing else. Copper is only copper, silver is just silver, and so on. Quite different, isn't it, from the rocks which like granite are made of many kinds of minerals all cemented together?

Then too, you know how we can hammer copper into whatever shape we wish, or pull it out into a long wire. Or how we can bend heated iron or pound it into different forms. We could not pull granite or marble rock into a wire or bend a quartz crystal. Only the metals are ductile like this.

As with the shine, so with this power to bend, not quite all of the metals have it. This piece of mica here among our lesson specimens shines like a metal, but see how it cracks and breaks as soon as we try to bend or twist it. Yet, because it shines like a metal we call it sub-metallic, or a sub-metal. All rules seem to have their exceptions, and the habits of metals have theirs, too.

Most metals are also very heavy. Just feel the weight of this little piece of lead. As for gold, our great millionaires could not possibly lift their wealth if it were all in one lump of gold. Just a few million dollars would make a block of gold three feet high and as thick and wide. Imagine trying to lift that much lead, and yet gold is much heavier.

But do you see, our lesson-hour is up now, and by the look of the sun we had better be hunting for that "common junk" here along the creek before it grows too late. So we will leave the other metals for our next study hour. Such amazing things they have to tell us, these shining metals lying so quietly here. But their secrets will keep quite safely until our next Club meeting day.

COMMON JUNK

Now let us pick up all the interesting stones we can find among these pebbles. Look, here is one with deep scratches all across it. Such a history this little stone has had. It is only visiting here by our creek, for its real home is far away up in Canada. To be sure, its visit is a very long one, some thousands of years long, but that is because of the Ice Age.

It was then that this little stone, with quantities of others, was picked up in its Canadian home and frozen solidly into a great glacier. Slowly the glacier moved ever farther and farther southward. But at last it reached a line where its ice began to melt. Then out dropped the stones it had brought from so far away, like passengers alighting from an exceedingly chilly coach.

For the passengers who were far enough inside the coach, the journey was an easy ride. But alas! It was not easy for this little stone. It must have been near the edge of the great glacier. As the glacier moved, the stone was scraped along against the great rocks in its path. That was what made these sharp scratches. Small wonder they are so deep, for some of that ice was a mile high. Imagine such tremendous pressure.

Doubtless our little stone here was much larger when it started on its adventurous ride. Shall we prove it? Then see how rounded its top is, and how flat its scratched side. Once it was all round, but bit by bit it was scoured away on the underside by the rough rocks over which the glacier shoved it. That glacier melted away at least twenty thousand years ago. So you see how very old it is, this little glacier-scratched rock, and what a thrilling adventure its life has been.

Equally thrilling were the experiences of this little stone beside it, but far different was its fiery fate. The glacier rock had to stand thousands of years of intensest cold. But this little stone had terrific heat to bear. How do we know? Do you see these white and light gray lines wavering across it? They tell us its story.

Once long ago it was part of a big mountain of rock. Then came great jarring earthquakes, cracking the rock and thrusting parts of it far down into the earth, and uplifting other parts. Tremendous earth heat was there too, so that some of the minerals in the rock melted and flowed into the new-made cracks. It softened the pebbles and pieces of broken rock and flattened them out like bits of dough.

At last the heat died away, and the stone with is zizzag bands grew cold and hard again. Those light gray patches are the flattened pebbles and bits of rock. You can easily see their outline. The white lines are the melted minerals—quartz in this stone —which filled the cracks. Terrifying earthquakes and terrific heat! That is the history of this little stone.

As for this small "pudding stone" over here, once it was part of an ancient pebbly beach. Gradually the pebbles were cemented together by lime-filled water, and at last the whole mass was up-thrust and broken into pieces by some of the great earth heavings thousands of years ago. Pudding stone this rock is called, since these small pebbles in it fancifully look like little plums in a pudding.

Now what do you think of the common junk to be picked up anywhere one happens to be? You see, there is not a stone in this whole big world of ours but has had a perfectly wonderful history. So wherever you are, be sure that any stone or little crystal or bit of metal that you may find has had just as fascinating a history as that of this little glacier rock, or the small mashed pebbles, and the pudding stone.

We must hurry back now, for the sun is sinking low, but perhaps some other day we can come again to the creek to look for more "common junk" and its amazing tales of adventure.

PRIZE WINNERS

Through a delay in the mails the following April prize winners were omitted. First class prize to David Wheeler, Vt., pyrite ball. Eugene Goldsby, Washington, chrysocolla. Lucille Stevens, New York, rhodonite. Paul Zimmer, Ohio, pyrite crystals. Doris Russell, Pa., rutile. James Russell, Pa., petrified wood. Second Class prize to Robert Wilson, Minn., yellow lepidolite. Russell Filer, California,

chrysocolla. Charles Waters, New York, garnet schist. Third Class prize to George Van Pelt, Indiana, amazonstone.

The three best first class May prize winners were Pat O'Lane, Canada, brown jasper. Paul Brown, California, fossil fern. Lucille Stevens, New York, drussy quartz.

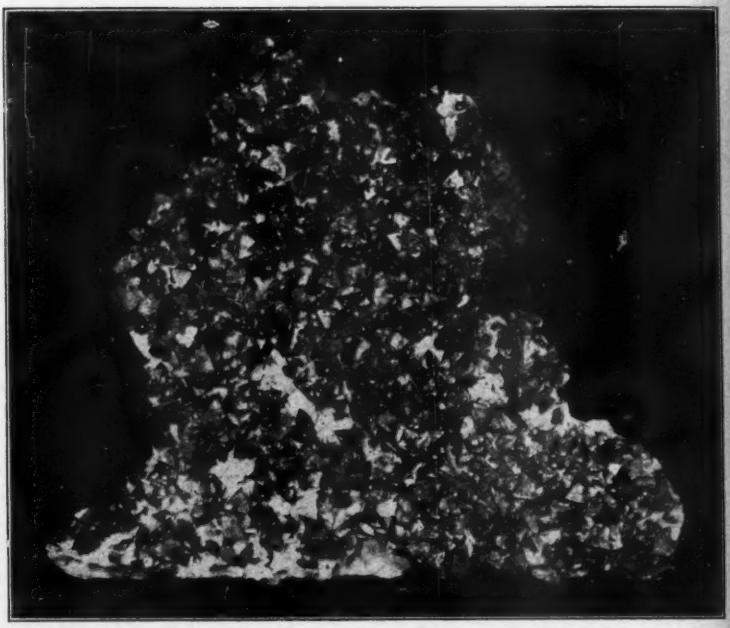
The three second best class winners were Doris Russell, Pa., micro-mount. Verna Harding, Pa., brown jasper. Charles Ball, New York, rhodonite.

Two best third class winners were I. Narkiewiez, Conn., floating stone. Hazel Richardson, So. Dakota, drussy quartz.

Now I must say Goodby to you, dear Club members, for with this meeting I am leaving the Club to take up other magazine work elsewhere. It has been such a pleasure, meeting with you each month, and hearing all about your collections.

Heartily I wish you success, and who knows? perhaps sometime we may meet again in some other interesting club study.

Sincerely yours,
ILSIEN NATHALIE GAYLORD.



Courtesy of Houston Museum of Natural History

CHALCOPYRITE CRYSTALLIZED ON DOLOMITE, PICHER, OKLA.